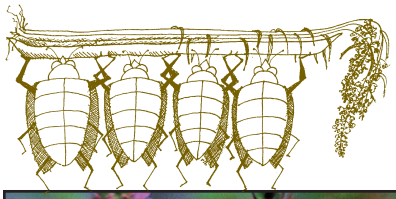


ACTIVITY 10 GRADES 8-12

Objectives

Students will determine how far *Galerucella* beetles will travel in a controlled, indoor setting to find their host food (migration).

Students will determine factors that may cause unsuccessful migration of *Galerucella* beetles in a controlled, indoor setting (mortality/survival rates).

Students will discuss their findings and relate them to real life factors in nature that might affect migration and mortality/survival during migration of *Galerucella* beetles.

Time Suggestion

Five minutes initially; thereafter, occasional 20 minutes on an ongoing basis.

Wisconsin Model Environmental Education and Science Standards

Environmental Education: A.8.2, A.8.3, A.8.4, A.12.2.

Science: F.8.6, F.12.12.

Galerucella RELEASE AND RETRIEVAL*

DESCRIPTION

Students design and conduct experiments in a controlled indoor setting to study migration and mortality/survival rates during migration of *Galerucella* beetles. Beetles can be observed after release from propagation in mid-summer, or during natural emergence from the ground in early spring.

PROBLEM

What are some of the factors that may affect beetle migration and mortality/survival rates during migration?

MATERIALS

- ☐ Live *Galerucella* beetles (from field or Biocontrol Program).
- ☐ Various potted plants, including purple loosestrife.
- ☐ Student observation notebooks.

WISCONSIN WETLANDS ASSOCIATION

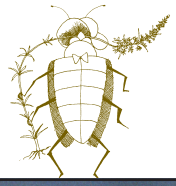
Galerucella beetles actively seek out loosestrife plants, even potted plants placed throughout your classroom.

PREPARATION

If necessary, obtain permission from your principal and/or custodian to do this experiment. The beetles are harmless.

PROCEDURES

1. In your classroom, set various plants around the room, including a purple loosestrife plant.
2. After school, release a predetermined number of *Galerucella* beetles into the center of the room (25-50 should be sufficient, depending on the circumstances).
3. Have students brainstorm places where beetles might be found in the classroom (i.e. the window, the lights, sink, or the plants).



ACTIVITY 10 *Galerucella* RELEASE AND RETRIEVAL (CONTINUED)

4. Over a period of time—perhaps several days to a week—have students search for and record the locations where beetles are found. Identify the locations of as many of the beetles as possible at any given time. (Perhaps assign several students to come in during lunch, recess, or study hall to look for beetles.) Students may want to sweep floors to find beetles. Continue all other normal daily activities in the room.
5. Whenever a *Galerucella* beetle is found on purple loosestrife, it's host plant, it is considered to have reached its destination. Have students record how long it took for the beetle to find the loosestrife and the distance traveled from the original release site. Then remove the beetle from the experiment.
6. If *Galerucella* beetles are found elsewhere, have students record the locations, but leave live beetles alone to continue the experiment.
7. If a dead *Galerucella* beetle is found, have students try to determine the cause of death (such as being stepped on, smashed in a book, caught in a spider web, etc.) and record this information.
8. After a predetermined time has elapsed, have students use the information recorded to find out how many beetles made it to the "safe haven" of the purple loosestrife plant, and how far they traveled in how long a time. Note how many are either dead or missing and the suspected reasons for this. Have students graph their results. (Please use all live beetles at the end for propagation, or field-release them.)
9. Ask students to predict what the survival rates might be if more beetles were released, more purple loosestrife was made available, or if the loosestrife was closer to the release site.
10. Discuss variations that could be done to answer different questions about *Galerucella* beetle migration and survival during migration.

BACKGROUND INFORMATION

Survival of *Galerucella* beetles in the wild depends on them finding purple loosestrife for food when adults re-emerge from the soil in spring and after pupation in mid summer. If they find food they will live, but they are susceptible to many causes of mortality along the way, such as food too far away or too hard to find, predation, pesticides, storm events, and other types of accidents.

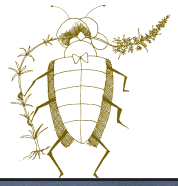
In Europe and Asia where the *Galerucella* beetles (used as biocontrol insects here) are native, the beetles also continually migrate over distances to new patches of purple loosestrife. The loosestrife in old patches, having been attacked and weakened by as many as a hundred different kinds of insects, are often shorter than before and can even disappear as they are out competed by other, taller plants around them. Having little or no food, the beetles must move to find new food patches elsewhere.

Thus, beetles reared and released here in Wisconsin can also be expected to both migrate to new loosestrife patches and move in the fall and spring. In fact, biologists depend on the beetles to find new loosestrife plants since many hard to find patches of the plant will likely never receive beetles from the Biocontrol Program or it's citizen cooperators.

It is important for us to understand the *Galerucella* beetles' local migratory behavior and determine what kinds of factors contribute to success or failure. Many beetles will die during migration, but if we know more about how many and why, we can better predict their effectiveness as biological controls. Perhaps something could even be done to make them more successful.

STUDENT ASSESSMENT

Students should be able to discuss the merits and short-comings of this activity and how their findings might or might not apply to what might occur in real life in an uncontrolled setting such as a wetland.



ACTIVITY 10 *Galerucella* RELEASE AND RETRIEVAL (CONTINUED)

EXTENSIONS

Conduct the experiment using the following variations:

- Change temperature and/or light conditions (Note: these conditions vary due to room lighting, etc.).
- Change plant size and/or number.
- Use both new and old growth purple loosestrife plants.
- Move entire experiment to a larger room like a gymnasium or auditorium (with permission).
- Leave the classroom door open, and place plants down the hall at different distances from the release site (with permission).
- Devise a way this same experiment or parts of it could be done outside.
- Relate potential hazards in the classroom to hazards that may be encountered outdoors.
- If any beetles are missing, extend the experiment for a longer period of time to see if any of the missing beetles return.

* Activity based on experience of Waupun teacher Karen Hausauer.